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Pesticide Fact Sheet Number 84
Thiophanate Ethyl

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16. Abstract (Limit: 200 words)

This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

17. Document Analysis a. Descriptors

Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, Science Findings

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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Office of Pesticide Programs (TS-766C)
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EPA

Pesticide Fact Sheet

Name of Chemical: Thiophanate Ethyl
Reason for Issuance: Registration Standard
Date Issued: February 1986
Fact Sheet Number: 84

1. Description of chemical

Generic name: Diethyl 4,4 '-o-phenylenebis[3-thioallophanate]
Common name: Thiophanate, thiophanate ethyl
Trade name: Topsin, Cleary's 3336, Cercobin
EPA Shaughnessy code: 103401
Chemical Abstracts Service (CAS) number: 23564-06-9
Year of initial registration: 1973
Pesticide type: Fungicide
Chemical family: Thiophanate
U.S. and foreign producers: Nippon Soda Co., Ltd., Japan
Pennwalt Corporation

2. Use patterns and formulations

Application sites: turf (golf courses), roses, flowers, ornamentals, and shade trees.

Formulations: Wettable powder, flowable concentrate.

Types and methods of application: Applied as a spray by means of hand-held equipment such as compressed air sprayers, hose end sprayers, spray guns or possibly sprinkling cans or by boom sprayers mounted from a tractor or trailer pulled by a tractor.

Application rates: 1.36 to 10.9 lb/ai/A for turf uses and 0.25 to 0.75 lb ai for per 100 gallons for ornamental uses.

Usual carriers: water

3. Science findings

Summary science statement: Although no human toxicological hazards of concern have been identified in studies reviewed by the Agency for the standard, extensive environmental data gaps exist for thiophanate ethyl. The Agency has no information that indicates continued use will result in any unreasonable adverse effects to man or the environment during the time required to develop the data.

Chemical characteristics: Technical thiophanate ethyl is a white to pale brown crystalline powder with a faint sulfur odor. It has a melting point of 191.7° C and a specific gravity of 1.44. It is stable in acid and slightly decomposes in base.

Toxicology Characteristics: Acute toxicity studies indicate that thiophanate ethyl has moderate to low acute toxicity to humans.

Study	Results	Toxicity Category
Acute inhalation	LC_{50} = 6.7 mg/L	III
Acute dermal	LD_{50} > 15,000 mg/kg	III
Primary skin irritation	Non-irritating	III
Acute oral	LD_{50} > 15,000 mg/kg	IV
Primary eye irritation	Non-irritating	IV

Studies conducted in rats and mice indicate that thiophanate ethyl is not oncogenic in laboratory animals. No decision can be made concerning the teratogenic and mutagenic potential of thiophanate ethyl until such studies are submitted to the Agency.

Biochemical Behavioral Characteristics: Thiophanate ethyl slowly converts to ethyl-2-benzimidazole carbamate (EBC) which is considered to be the fungicidally active agent. The mode of action of EBC involves its interference in the biosynthesis of DNA in the fungal cell division process.

Environmental Characteristics: The environmental fate and transport of and the potential exposure to thiophanate ethyl cannot be characterized until the required environmental fate data are submitted.

Ecological Characteristics: Thiophanate ethyl has extremely low toxicity to birds with an avian dietary LC_{50} greater than 5620 ppm and avian oral LD_{50} greater than 2510 mg/kg. Thiophanate ethyl has moderate toxicity to fish and aquatic invertebrates with a fish LC_{50} of 2.26 to 2.6 ppm and an aquatic invertebrate LC_{50} of 2.6 ppm.

Tolerance Reassessment: To date there have been no U.S. tolerances or registrations on food/feed items for thiophanate ethyl.

4. Summary of Regulatory Position and Rationale

Based on the review and evaluation of all available data and other relevant information on thiophanate ethyl, the Agency has made the following determinations:

The available data are insufficient to indicate that any of the risk criteria set forth in 40 CFR §162.11(a) have been met or exceeded for the uses of thiophanate ethyl at the present time. For example, (1) Thiophanate ethyl is not oncogenic in rats or mice, (2) Potential exposure to the active metabolite EBC from uses currently covered by the standard does not raise concern at this time, and (3) thiophanate ethyl has moderate to low acute toxicity to

humans. The available data, however, are incomplete and no decision concerning the teratogenicity, mutagenicity, or environmental fate of thiophanate ethyl can be made until the required data are submitted. Thiophanate ethyl has extremely low toxicity to birds and moderate toxicity to fish and aquatic invertebrates. Additional acute toxicity testing with channel catfish is being required because the chemically related compounds thiophanate methyl and benomyl are highly toxic to the ictalurid (catfish) family. A detailed ecological hazard assessment cannot be made until certain environmental fate data requirements have been met.

End-use product (EP) labels will be required to bear a revised environmental hazard statement.

EP labels will be required to maintain a grazing/feeding restriction.

Manufacturing-use product (MP) labels will be required to bear a statement regarding discharge to bodies of water and sewer systems.

Specific label warning statements:

Hazard Information

The human hazard statements must appear on all labels as prescribed in 40 CFR 162.10(h).

Environmental Hazard Statement

All MPs intended for formulation into EPs must bear the following statements:

"Do not discharge effluent containing this product directly into lakes, streams, ponds, estuaries, oceans or public waters unless this product is specifically identified and addressed in a National Pollutant Discharge Elimination System (NPDES) permit. Do not discharge effluent containing this product into sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the Environmental Protection Agency."

End-Use Product Statements

The following environmental hazard statement must appear on all EP products:

"Do not apply directly to water or wetlands (swamps, bogs, marshes, and potholes). Do not contaminate water by cleaning of equipment or disposal of wastes."

The following feeding/grazing restriction statement must appear on all EP products:

"Do not graze treated areas or feed clippings to livestock."

5. Summary of Major Data Gaps and Dates for Submission

Product Chemistry
- Product Identity (December 1986)
- Analysis and Certification of Product Ingredients (June 1986)
- Physical and Chemical Characteristics (June 1986)

Environmental Fate
- Hydrolysis (June 1986)
- Photodegradation (June 1986)
- Metabolism (December 1987)
- Mobility Studies (June 1986)
- Soil Dissipation Studies (December 1987)
- Fish Accumulation Studies (June 1986)

Toxicology
- 21-Day Dermal (June 1986)
- Teratogenicity (September 1986)
- Mutagenicity Testing (June 1986)

Wildlife and Aquatic Organisms
- Freshwater Fish and Freshwater Invertebrates Acute Toxicity (September 1986)

6. Contact Person at EPA

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